BONNIE LAURA SUBDIVISION (PWS 3230004)
SOURCE WATER ASSESSMENT OPERATOR REPORT

May 17, 2004

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of this designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Drinking water Assessment for Bonnie Laura Subdivision, Emmett, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, e.g. nitrates, arsenic), volatile organic contaminants (VOCs, e.g. petroleum products), synthetic organic contaminants (SOCs, e.g. pesticides), and microbial contaminants (e.g. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

The Bonnie Laura Subdivision drinking water system consists of two wells. Though the wellheads have never had any total coliform bacteria detections, two locations on Lilac Lane (distribution system) recorded total coliform bacteria in March 1993. Other water chemistry tests at the wellhead have shown no significant problems. In terms of total susceptibility, the Bonnie Laura Subdivision rated high for IOC, VOC, SOC, and microbial contamination. In terms of overall susceptibility, the Bonnie Laura Subdivision ranked moderate in all classes, including microbial contamination.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the Bonnie Laura Subdivision, drinking water protection activities should focus on maintaining the requirements of the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Drinking water protection activities should also focus on implementation of practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated drinking water areas. Also, disinfection practices should be implemented if microbial contamination of the distribution system becomes a problem. No chemicals should be stored or applied within the 50-foot radius of the wellhead. Most of the designated areas are outside the direct jurisdiction of the Bonnie Laura

Subdivision. Partnerships with state and local agencies and industry groups should be established and are critical to success. Continued vigilance in keeping the well protected from surface flooding can also keep the potential for contamination reduced. Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near urban and residential land use areas. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission and Gem Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community with a fully-developed drinking water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR BONNIE LAURA SUBDIVISION, EMMETT, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated drinking water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop this assessment is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments for sources active prior to 1999 were completed by May of 2003. SWAs for sources activated post-1999 are being developed on a case-by-case basis. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Drinking Water Quality

The Bonnie Laura Subdivision, near Emmett, Idaho is a community system serving approximately 60 people with 26 connections, located in Gem County, north of the city of Emmett, in the Emmett Valley ¾ mile east of the intersection of Jackson Avenue and Sunset Dr. (Figure 1). The public drinking water system for Bonnie Laura Subdivision is comprised of two wells.

No significant water chemistry problems have been recorded in the well water, though the possibility of contamination from agricultural uses remains high. Nitrate has not been detected in any water samples collected from the system. IOC contaminants fluoride, selenium, and sodium have all been previously detected at concentrations much less than the maximum contaminant level (MCL).

Defining the Zones of Contribution--Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) time-of-travel (TOT) for water associated with the Payette Valley aquifer in the vicinity of the Bonnie Laura Subdivision. The computer model used site specific data, assimilated by DEQ from a variety of sources including the Bonnie Laura Subdivision well log and other local area well logs. The delineated drinking water assessment area for Bonnie Laura Subdivision can best be described as a corridor ½ mile wide and 2 miles long extending east, then northeast with a southern border along the Payette River. The actual data used by DEQ in determining the drinking water assessment delineation areas are available upon request.

Hydrogeology

The Payette River is located in Southwest Idaho and along with the Boise and Weiser River is one of three major tributaries contributing to the Snake River from the southwest portion of the state. The watershed area below Black Canyon Dam is approximately 380,000 acres. Uplands and non-irrigated rangeland constitute most of the land features and land use. Irrigated croplands, orchards and pastures make up approximately 100,000 acres. These are mainly in the lower Payette River Valley and the Big and Little Willow Creek drainages.

The lower Payette River is the dominant hydrologic feature in the implementation area. The river flows westerly, and joins the Snake River near Payette, Idaho. The river is used for irrigation water and is the main receiving water for irrigation return flows and point source discharges.

Flows are governed by snow pack melt, precipitation events, reservoir storage, flood control, irrigation water demand and fish flow augmentations. Three major impoundments, outside the basin assessment area, are used to regulate flows. The Lower Payette Canal (Payette Slough) services agricultural areas between Payette and Weiser, Idaho. Return flows are diverted into the Snake River or the Weiser River. The lower Payette River would naturally be a braided system due to low gradient and the large volume of sediment delivery. However, due to channelization for flood control, water diversions and Black Canyon Dam, the system is now an F channel type (Rosgen, 1996). F channel types are those characterized with confined banks and a high width to depth ratio.

The lower Payette River below Black Canyon Dam has diversions throughout the system. Water diversion averages 1,200 cfs, or about 500,000-acre feet annually (Water District #65, 1997). Water withdrawals are measured and regulated by irrigation water demand and water rights through the Payette Water District #65 and the separate irrigation districts. The western section of the valley is primarily dominated by irrigation water return drains that drain agricultural lands south to north. These drains either followed natural ephemeral streams or were constructed. Although not as numerous, the eastern section also has constructed drains. The major drains are the County line (Gospel Drain), Tunnel #7 and Plaza. On the north side of the eastern section, the upper Emmett Bench area, drainage is through ephemeral, intermittent or perennial streams, such as Bissel and Haw Creeks. However, constructed drains, such as the Pioneer Drain and the Big 4 Drain, are also dominant drainage conveyances

The lower Payette River is located in a semi-arid area. Precipitation is usually less than 20 inches/year throughout the area. Summer months are usually hot and dry with occasional thunderstorms with brief heavy precipitation events. For the period from August 1, 1947 through June 30, 1997, at Payette, Idaho, the average maximum temperature for the months of June through September was 86.9°F with a minimum temperature during the same period of 51.7°F. From June through September average monthly precipitation is 0.45 inches, with a total average precipitation for that period of 1.8 inches. Average annual precipitation is approximately 10.6 inches (Western Regional Climate Center, 1997).

The winter months, December through March, are usually cool with approximately half of the annual precipitation events occurring during this period. The average maximum temperature for the period of August 1948 through June 1997 for the months of December through March was 44.5°F, while the average minimum temperature was 24.3°F. The average monthly precipitation is 1.27 inches. The average total precipitation is 5.1 inches during this period (Western Regional Climate Center, 2002).

The upper Payette River drains much of the highland areas of the Boise Mountains in west central Idaho. Cretaceous granitic intrusive of the Idaho Batholith dominates much of this area. However, in the vicinity of Black Canyon Reservoir the Payette River transects younger Miocene basalt lava flows. The lavas are part of the Weiser Embayment flood basalts correlative to the Columbia River Basalt Group of central and eastern Washington, northeastern Oregon and western Idaho. In contrast, most of the lower Payette River and its tributaries, below Black Canyon Dam flows upon a basement lithology of late Miocene and Pliocene lake and stream deposits and outwash from Pleistocene mountain glaciation which produced multiple fluvial deposits on the surface of the older lake beds. Most recently, Holocene alluvial clay, silt, sand and gravel compose the more surficial deposits within the lower Payette River channel, floodplain and tributaries.

A significant contrast in river gradient and geomorphology is present between the upper and lower reaches of the Payette River. Descending from mountainous terrain, the upper Payette River is so steep it has a well known reputation for challenging white-water recreation. However, during normal flows the lower Payette River meanders relatively slowly down its low-relief valley, the drainage basically being a morphological extension of the Snake River Plain. Current morphology of the river's lower section is at a mature stage of development with well-developed meanders and a broad floodplain.

The general hydraulic setting of the subdivision is situated on lacustrine sediments. Through erosion, hills have been created in these materials. Evidence from existing wells suggest that the thickness be greater than 800 feet. The formation consists of layered sand, silt, gravel, and clay. The first water layer is often several hundred feet down. The yields from the wells are highly variable ranging from several hundred gallons per minute to a few gallons per minute.

The hydrology and water quality of the Lower Payette area have been extensively studied over the last fifteen years. Agencies which have conducted investigations include the University of Idaho (Dieck and Ralston, 1986), United States Geological Survey (Parliman, 1986), Idaho Division of Environmental Quality (IDEQ, 1994, 1996), Idaho Department of Agriculture (IDA, 1998) and the Natural Resources Conservation Service (NRCS, 1991). While these studies have documented areas of water quality problems a complete understanding of the hydrogeological system of the area is still lacking. The study area was included in the Snake-Payette Hydrologic Unit Assessment conducted by the NRCS (1991). The goal of the NRCS assessment was to accelerate the transfer of technology necessary to protect groundwater and surface water while maintaining farm profitability.

The Payette Valley forms a somewhat crescent-shaped, flat-floored valley bounded by the uplands of Squaw Butte to the north, the foothills to the Boise Front Mountains to the east, the ASouth Slope foothills to the south, and the Snake River to the west. The valley floor slopes gently to the west/northwest and is drained by the Payette River except for the westernmost portion of the basin which is also drained by the Snake River. Elevations in the valley range from about 2,380 feet above mean sea level east of Emmett, to about 2,010 feet at the Snake River at the town of Payette. The foothills and uplands are composed of basalt, granite, and both sedimentary rocks and unconsolidated sedimentary deposits. The valley is filled with erosional remnants derived primarily from these rocks and deposits. The alluvial fill of the Payette Valley can be divided into two major units: the younger fluvial deposits, and the older lacustrine deposits. The younger fluvial deposits consist of clay, silt, sand, and gravel. The older lacustrine deposits represent the majority of the basin-fill material and consist of interfingering beds and lenses of clay, silt, and sand.

There are two major aquifers in the valley that are found in the alluvial fill: a shallow water table aquifer and a deeper blue clay aquifer. Each aquifer possesses differing physical and chemical characteristics. The shallow Payette Valley water table aquifer is contained within the fluvial deposits. In the Fruitland area, these deposits are clay- and silt-dominated. Lithologic drill logs in the area show an average of 70 percent clay/silt, 17 percent gravel, and 13 percent sand. Cross-sections constructed from lithologic drill logs suggest that the depositional environment consists of stacked channel deposits of moderate sinuosity, with abrupt lateral variations. Water wells typically yield less than 500 gallons per minute (GPM) from the gravel and sand deposits. Recharge is primarily from infiltration of diverted irrigation water and leakage from the Payette River and its tributaries. The deeper Payette Valley blue clay aquifer is contained within lacustrine deposits. Lithologic drill logs in the area show an average of 75 to 96 percent blue clay, with the remainder being intervals of sand that vary in thickness from inches to feet. Analysis of lithologic drill logs in the area suggest that the sand intervals are lens-shaped, with moderate to poor lateral and vertical interconnectedness. This interconnectedness decreases with depth. Yields typically average less than 50 GPM from the sand lenses. The primary source of recharge to this aquifer is assumed to be historic runoff from the surrounding mountains. Only a small potential for recharge can be attributed to leakage from the Payette River and its tributaries, and infiltration of diverted irrigation water. Groundwater from the blue clay aquifer may have a long residence time. The wells within the vicinity of Fruitland are completed in both fluvial and lacustrine deposits. The degree and nature of any hydraulic connection between the shallow and the deeper water-bearing units is not well understood. Groundwater flow in the study area for both the shallow and deeper aquifers is generally in a north-northwesterly direction.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

The dominant land use outside the Bonnie Laura Subdivision is irrigated cropland. Land use within the immediate area of the wellhead consists of urban and residential uses.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems

can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during October of 2003 and April 2004. The first phase involved identifying and documenting potential contaminant sources within the Bonnie Laura Subdivision Drinking water Assessment Area through the use of computer databases and Geographic Information System maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of Chuck Rekow.

Four potential contaminant sites are located within the delineated drinking water area (Table 1). The sources include a gravel pit, a household and commercial storage business, and a school bus shop with an underground storage tank (UST) and a completed leaking underground storage tank (LUST) cleanup. The gravel pit is located within the 3-year time of travel. The other three potential contaminant sources are located in the 3- to 6-year time of travel zone. Additionally, a large part of Zone 1B is in the Payette River floodplain, so the river is an additional potential source of contamination (Figure 2).

Table 1. Bonnie Laura Subdivision, Potential Contaminant Inventory

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	Gravel Pit	0-3	Database Search	VOC, SOC
2	UST	3-6	Database Search	VOC, SOC
3	LUST	3-6	Database Search	VOC, SOC
4	Storage-Household and Commercial	3-6	Database Search	IOC, VOC, SOC

[1] UST = underground storage tank, LUST = leaking underground storage tank
[2] TOT = time of travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity was moderate for the wells (see Table 2). This reflects the nature of the soils being in the moderately-drained to well-drained class, and the vadose zone being composed predominantly of gravel. Additionally, there is not a laterally extensive low permeability unit that could retard downward movement to the water table, which is located 5 feet below land surface.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

Well construction directly affects the ability of the well to protect the aquifer from contaminants. The Bonnie Laura Subdivision drinking water system consists of two wells that extract ground water for domestic uses. The well system construction score was moderate for the wells, based on 1989 and 2002 sanitary surveys showing compliance with well seals and flood protection standards. A well log was only available for the well #1. Though well #1 was probably in compliance when it was installed, it does not meet current public water system (PWS) construction standards. Construction details for well #2 are unknown due to the lack of a well log for this well.

The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Table 1 of the *Recommended Standards for Water Works* (1997) states that 8-inch steel casing requires a thickness of 0.322 inches, instead of the 0.250 inches that was used. The standards state that screen will be installed and have openings based on sieve analysis of the formation. Standard 3.2.4.1 requires all PWSs to have yield and drawdown tests that last “24 hours or until stabilized drawdown has continued for six hours at 1.5 times” (Recommended Standards for Water Works, 1997) the design pumping rate.

Well #1 in the Bonnie Laura Subdivision system has a total depth of about 140 feet below ground surface (bgs). This well was gravel packed across its entire length. Additionally, well #1 was perforated from 60 feet bgs to 130 feet bgs. The well casing was sealed to a depth of 20 feet. No blue clay layer was identified, implying that the Bonnie Laura Subdivision well is completed in the upper, unconfined aquifer. The construction details for well #2 are assumed to be similar to well #1.

Potential Contaminant Source and Land Use

The wells rated moderate for IOCs (e.g. nitrates), SOCs (e.g. pesticides), and VOCs (e.g. petroleum products). The wells rated low for microbial contaminants. Agricultural chemical sources and irrigated agricultural land use in the delineated source area contributed the largest numbers of IOC points to the contaminant inventory rating. VOCs and SOCs could potentially come from the gravel pit and the LUST site. The Payette River as well as agricultural uses could potentially contribute microbial contaminants.

Though the wellheads have never had any total coliform bacteria detections, two locations on Lilac Lane near the wellhead recorded total coliform bacteria in March 1993. These detections are assumed to be within the distribution system. Other water chemistry tests at the wellheads have shown no significant problems.

Final Susceptibility Ranking

A detection above a drinking water standard maximum contaminant level (MCL) or a detection of total coliform bacteria or fecal coliform bacteria will automatically give a high susceptibility rating to a wells despite the land use of the area because a pathway for contamination already exists. In terms of total susceptibility, the wells rate moderate for all types of contamination including microbial contamination. These ratings are predominantly caused by the hydrologic sensitivity and the predominantly agricultural land uses. Having potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) and Zone 2 also are contributing factors.

Table 2. Summary of Bonnie Laura Subdivision Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
1	M	M	M	M	L	M	M	M	M	M
2	M	M	M	M	L	M	M	M	M	M

[1]H = High Susceptibility, M = Moderate Susceptibility, Low Susceptibility
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

No type of contamination currently threatens the Bonnie Laura Subdivision drinking water system. There is the potential, however, of microbial contamination of the system as there have been previous detections of total coliform bacteria in the distribution center. The wells also showed a high susceptibility to IOC contamination from local agricultural land uses, as well as VOC and SOC contamination from nearby potential contaminant sources.

The wells in the Bonnie Laura Subdivision system takes its water from the shallow, unconfined to semi-confined alluvial (river deposited material) aquifer. The shallow aquifer has been demonstrated to be a distinct water-bearing unit in terms of water quality, water yield, and the sources of recharge (DEQ, 2000). Ground water in the shallow aquifer is recharged primarily from surface water irrigation, direct precipitation, and canal leakage.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For Bonnie Laura Subdivision, drinking water protection activities should focus on implementation of practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the delineated drinking water areas. Most of the delineated areas are outside the direct jurisdiction of Bonnie Laura Subdivision. Partnerships with state and local agricultural agencies and industry groups should be established and are critical to success. Continued vigilance in keeping the well protected from surface flooding can also keep the potential for contamination reduced. If microbial contamination problems persist, continuous disinfection would reduce the risk of bacteriological contamination. Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Drinking water protection activities for agriculture should be coordinated with the Idaho Department of Agriculture, the Soil Conservation Commission, the Gem Soil and Water Conservation District, and the Natural Resources Conservation Service.

Assistance

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office	(208) 373-0550
State DEQ Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, Idaho Rural Water Association, at 1-208-373-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund≅ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the drinking water assessment area.

References Cited

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Attachment A

Bonnie Laura Subdivision Susceptibility Analysis Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Public Water System Name:	Bonnie Laura Subdivision
Public Water System Number:	3140200
Well Number:	1
Date:	4/6/2004
Person Conducting Assessment:	Dennis Owsley

Hydrologic Sensitivity Worksheet

	Question	Yes	No	Value
(1)	Do the soils belong to drainage classes in the poorly drained through moderately well drained categories?	◉ Yes	○ No	0
(2)	Is the vadose zone composed predominantly of gravel, fractured rock, or is unknown?	◉ Yes	○ No	1
(3)	Is the depth to first groundwater greater than 300 feet?	○ Yes	◉ No	1
(4)	Is an aquitard present with silt/clay or sedimentary interbeds within basalt with greater than 50 feet cumulative thickness?	○ Yes	◉ No	2
		Hydrologic Sensitivity Score =		**4**

Final Hydrologic Sensitivity Ranking = Moderate Hydrologic Sensitivity Score (2 to 4 points)

Public Water System Name:	Bonnie Laura Subdivision	Version 2.1
Public Water System Number:	3140200	5/19/1999
Well Number:	1	
Date:	4/1/2004	
Person Conducting Assessment:	Dennis Owsley	

Potential Contaminant Source/Land Use Worksheet

Land Use/Zone IA

	Question	Response		IOC Score	VOC Score	SOC Score	Microbial Score
(1)	Land Use (Pick the Predominant Land Type)	Irrigated Cropland		2	2	2	2
(2)	Is Farm Chemical Use High or Unknown? (Answer No if (1) = Urban/Commercial)	◉ Yes	○ No	Complete Step 2a			
2a	Indicate appropriate chemical category	☑ IOCs ☐ VOCs ☐ SOCs		2	0	0	0
(3)	Are IOC, VOC, SOC, Microbial or Radionuclide contaminant sources Present in Zone IA? OR Have SOC/VOC contaminants been detected in the well? OR have IOC contaminants been detected above MCL levels in the well? If Yes, please check the appropriate chemical	○ Yes ☑ IOCs ☑ VOCs ☑ SOCs ☑ Microbials	◉ No				
			Land Use Subtotal	4	2	2	2

Zone IB

	Question	Response		IOC Score	VOC Score	SOC Score	Microbial Score
(4)	Contaminant Sources Present in Zone IB?	◉ Yes	○ No				
	Number of Sources in Zone IB in Each Category?	# IOC Sources	1	2	2	2	0
	(List sources by Category up to a Maximum of Four per Category)	# VOC Sources	1				
		# SOC Sources	1				
		# Microbial Sources	0				
(5)	Are there Sources of Class II or III Leachable Contaminants in Zone IB?	◉ Yes	○ No				
	(List Sources up to a Maximum of Four per Category)	# IOC Sources	4	4	0	0	0
		# VOC Sources	0				
		# SOC Sources	0				
(6)	Does a Group 1 Priority Area Intercept or Group 1 Priority Site Fall Within Zone IB?	○ Yes ☑ IOCs ☑ VOCs ☑ SOCs ☑ Microbials	◉ No	0	0	0	0
(7)	Pick the Best Description of the Amount and Type of Agricultural Land in Zone IB.	Greater Than 50 % Irrigated Agricultural Land		4	4	4	4
			Zone IB Subtotal	10	6	6	4
(8)	Is this a Transient Public Water System?	◉ Yes	○ No	Scoring Completed, Go to System Construction Worksheet			

	Zone II			IOC Score	VOC Score	SOC Score	Microbial Score
(9)	Are Contaminant Sources Present in Zone II?	◉ Yes ◯ No	Complete Step 9a				
9a	What types of chemicals?	☑ IOCs ☑ VOCs ☑ SOCs		2	2	2	0
(10)	Are there Sources of Class II or III Leachable Contaminants in Zone II?	◉ Yes ◯ No	Complete Step 10a				
10a	What type of contaminant?	☑ IOCs ☐ VOCs ☐ SOCs		1	0	0	0
(11)	Pick the Best Description of the Amount and Type of Agricultural Land in Zone II.	Greater Than 50 % Non-Irrigated Agricultural Land		1	1	1	0
		Zone II Subtotal		4	3	3	0

	Zone III			IOC Score	VOC Score	SOC Score	Microbial Score
(12)	Contaminant Sources Present in Zone III?	◯ Yes ◉ No	Go to Step 13				
12a	What types of contaminant?	☐ IOCs ☐ VOCs ☐ SOCs		0	0	0	0
(13)	Are there Sources of Class II or III Leachable Contaminants in Zone III?	◉ Yes ◯ No	Complete Step 13a				
13a	What types of contaminants?	☑ IOCs ☐ VOCs ☐ SOCs		1	0	0	0
(14)	Is there Irrigated Agricultural Land That Occupies > 50% of Zone III?	◉ Yes ◯ No		1	1	1	0
		Zone III Subtotal		2	1	1	0

	IOC Score	VOC Score	SOC Score	Microbial Score
Community and Non-Community, Non-Transient System Contaminant Source/Land Use Score	20	12	12	6

Final Community/NC-NT System Ranking

IOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
VOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
SOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
Microbial Score = Low Contaminant/Land Use Score (0 to 10 points)

Public Water System Name:	Bonnie Laura Subdivision			
Public Water System Number:	3140200			
Well Number:	1			
Date:	4/6/2004			
Person Conducting Assessment:	Dennis Owsley			

Source Construction Worksheet

(1)	Well Drill Date	Input Date	January 7, 1988		
(2)	Well Drillers Log Available?	(●) Yes ( ) No			
				Year	
(3)	Sanitary Survey Available? If Yes, for what year?	(●) Yes ( ) No		2002	
					Value
(4)	Are current IDWR well construction standards being met?		( ) Yes (●) No		1
(5)	Is the wellhead and surface seal maintained in good condition?		(●) Yes ( ) No		0
(6)	Do the casing and annular seal extend to a low permeability unit?		( ) Yes (●) No		2
(7)	Is the highest production interval of the well at least 100 feet below the static water level?		( ) Yes (●) No		1
(8)	Is the well located outside the 100 year floodplain and is it protected from surface runoff?		(●) Yes ( ) No		0
		Source Construction Score =			**4**
	Final Source Construction Ranking =	Moderate Source Construction Score (2 to 4 poir			

Public Water System Name:	Bonnie Laura Subdivision
Public Water System Number:	3140200
Well Number:	1
Date:	4/6/2004
Person Conducting Assessment:	Dennis Owsley

SWA Susceptibility Rating Sheet

Zone IA Susceptability Rating

Warning: Due to specific conditions found in Zone IA this well has been assigned a High overall susceptability for: No Contaminant Categories

This rating is based on: (1)The presence of contaminant sources in Zone IA or (2)The detection of specific SOC/VOC chemicals in the well or (3)The detection of specific IOC chemicals above MCL levels in the well.

Public Water Systems may petition IDEQ to revise susceptibility rating based on elimination of contaminant sources or other site-specific factors.

Community and Noncommunity-Nontransient Sources	IOC Score	SOC Score	VOC Score
Hydrologic Sensitivity Score =	4	4	4
Potential Contaminant Source/Land Use Score X 0.20 =	4	2	2
Source Construction Score =	4	4	4
Total	**12**	**10**	**10**

FINAL WELL RANKING

IOC Ranking is Moderate (6 to 12 points)

SOC Ranking is Moderate (6 to 12 points)

VOC Ranking is Moderate (6 to 12 points)

Microbial Susceptibility Rating	Score
Hydrologic Sensitivity Score =	4
Potential Contaminant Source/Land Use Score X 0.375 =	2
Source Construction Score =	4
Total	**10**

FINAL WELL RANKING

Microbial Ranking is Moderate (6 to 12 points)

Value
0
1
1
2

thickness?

Hydrologic Sensitivity Score = 4

Final Hydrologic Sensitivity Ranking = Moderate Hydrologic Sensitivity Score (2 to 4 points)

			Version 2.1
Public Water System Name:	Bonnie Laura Subdivision		
Public Water System Number:	3140200		5/19/1999
Well Number:	2		
Date:	4/1/2004		
Person Conducting Assessment:	Dennis Owsley		

Potential Contaminant Source/Land Use Worksheet

Land Use/Zone IA

			IOC Score	VOC Score	SOC Score	Microbial Score
(1)	Land Use (Pick the Predominant Land Type)	Irrigated Cropland	2	2	2	2
(2)	Is Farm Chemical Use High or Unknown? (Answer No if (1) = Urban/Commercial)	◉ Yes ○ No	Complete Step 2a			
2a	Indicate appropriate chemical category	☑ IOCs ☐ VOCs ☐ SOCs	2	0	0	0
(3)	Are IOC, VOC, SOC, Microbial or Radionuclide contaminant sources Present in Zone IA? OR Have SOC/VOC contaminants been detected in the well? OR have IOC contaminants been detected above MCL levels in the well? If Yes, please check the appropriate chemical	○ Yes ◉ No ☑ IOCs ☑ VOCs ☑ SOCs ☑ Microbials				
		Land Use Subtotal	4	2	2	2

Zone IB

				IOC Score	VOC Score	SOC Score	Microbial Score
(4)	Contaminant Sources Present in Zone IB?	◉ Yes ○ No					
	Number of Sources in Zone IB in Each Category?	# IOC Sources	1	2	2	2	0
	(List sources by Category up to a Maximum of Four per Category)	# VOC Sources	1				
		# SOC Sources	1				
		# Microbial Sources	0				
(5)	Are there Sources of Class II or III Leachable Contaminants in Zone IB?	◉ Yes ○ No		IOC Score	VOC Score	SOC Score	Microbial Score
	(List Sources up to a Maximum of Four per Category)	# IOC Sources	4	4	0	0	0
		# VOC Sources	0				
		# SOC Sources	0				
(6)	Does a Group 1 Priority Area Intercept or Group 1 Priority Site Fall Within Zone IB?	○ Yes ◉ No ☑ IOCs ☑ VOCs ☑ SOCs ☑ Microbials		0	0	0	0
(7)	Pick the Best Description of the Amount and Type of Agricultural Land in Zone IB.	Greater Than 50 % Irrigated Agricultural Land		4	4	4	4
		Zone IB Subtotal		10	6	6	4

(8)	Is this a Transient Public Water System?	◉ Yes ○ No	Scoring Completed, Go to System Construction Worksheet

Zone II				IOC Score	VOC Score	SOC Score	Microbial Score
(9)	Are Contaminant Sources Present in Zone II?	(•) Yes ( ) No	Complete Step 9a				
9a	What types of chemicals?	☑ IOCs ☑ VOCs ☑ SOCs		2	2	2	0
(10)	Are there Sources of Class II or III Leachable Contaminants in Zone II?	(•) Yes ( ) No	Complete Step 10a				
10a	What type of contaminant?	☑ IOCs ☐ VOCs ☐ SOCs		1	0	0	0
(11)	Pick the Best Description of the Amount and Type of Agricultural Land in Zone II.	Greater Than 50 % Non-Irrigated Agricultural Land		1	1	1	0
		Zone II Subtotal		4	3	3	0

Zone III				IOC Score	VOC Score	SOC Score	Microbial Score
(12)	Contaminant Sources Present in Zone III?	( ) Yes (•) No	Go to Step 13				
12a	What types of contaminant?	☐ IOCs ☐ VOCs ☐ SOCs		0	0	0	0
(13)	Are there Sources of Class II or III Leachable Contaminants in Zone III?	(•) Yes ( ) No	Complete Step 13a				
13a	What types of contaminants?	☑ IOCs ☐ VOCs ☐ SOCs		1	0	0	0
(14)	Is there Irrigated Agricultural Land That Occupies > 50% of Zone III?	(•) Yes ( ) No		1	1	1	0
		Zone III Subtotal		2	1	1	0

	IOC Score	VOC Score	SOC Score	Microbial Score
Community and Non-Community, Non-Transient System Contaminant Source/Land Use Score	20	12	12	6

Final Community/NC-NT System Ranking

IOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
VOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
SOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
Microbial Score = Low Contaminant/Land Use Score (0 to 10 points)

	Public Water System Name:	Bonnie Laura Subdivision			
	Public Water System Number:	3140200			
	Well Number:	2			
	Date:	4/6/2004			
	Person Conducting Assessment:	Dennis Owsley			

Source Construction Worksheet

				Year	Value
(1)	Well Drill Date	Input Date	January 7, 1988		
(2)	Well Drillers Log Available?	Yes	No (selected)		
(3)	Sanitary Survey Available? If Yes, for what year?	Yes (selected)	No	2002	
(4)	Are current IDWR well construction standards being met?		Yes / No (selected)		1
(5)	Is the wellhead and surface seal maintained in good condition?		Yes (selected) / No		0
(6)	Do the casing and annular seal extend to a low permeability unit?		Yes / No (selected)		2
(7)	Is the highest production interval of the well at least 100 feet below the static water level?		Yes / No (selected)		1
(8)	Is the well located outside the 100 year floodplain and is it protected from surface runoff?		Yes (selected) / No		0
		Source Construction Score =			**4**
	Final Source Construction Ranking =	Moderate Source Construction Score (2 to 4 poi			

Public Water System Name:	Bonnie Laura Subdivision			
Public Water System Number:	3140200			
Well Number:	2			
Date:	4/6/2004			
Person Conducting Assessment:	Dennis Owsley			

SWA Susceptibility Rating Sheet

Zone IA Susceptability Rating

Warning: Due to specific conditions found in Zone IA this well has been assigned a High overall susceptibility for:	No Contaminant Categories
This rating is based on: (1)The presence of contaminant sources in Zone IA or (2)The detection of specific SOC/VOC chemicals in the well or (3)The detection of specific IOC chemicals above MCL levels in the well.	
Public Water Systems may petition IDEQ to revise susceptibility rating based on elimination of contaminant sources or other site-specific factors.	

Community and Noncommunity-Nontransient Sources	IOC Score	SOC Score	VOC Score
Hydrologic Sensitivity Score =	4	4	4
Potential Contaminant Source/Land Use Score X 0.20 =	4	2	2
Source Construction Score =	4	4	4
Total	**12**	**10**	**10**
FINAL WELL RANKING			
IOC Ranking is Moderate (6 to 12 points)			
SOC Ranking is Moderate (6 to 12 points)			
VOC Ranking is Moderate (6 to 12 points)			

Microbial Susceptability Rating	Score
Hydrologic Sensitivity Score =	4
Potential Contaminant Source/Land Use Score X 0.375 =	2
Source Construction Score =	4
Total	**10**
FINAL WELL RANKING	
Microbial Ranking is Moderate (6 to 12 points)	